OCTOBER 22, 1960

SCHOOL AND SOCIETY

44th YEAR OF PUBLICATION

Problems of Doctoral Study in Education

TEACHING THE NEW MATHEMATICS

DEVELOPMENTS IN SOVIET EDUCATION

THE STUDY OF COOPERATIVE EDUCATION

Special 16-page Supplement:

Documents from the U.S.S.R.

SCHOOL AND SOCIETY

OCTOBER 22, 1960

Volume 88 Number 2179

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Edited by William W. Brickman
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CONTENTS—Preface; Introduction; *PART I*, THE NATIONAL SCENE: The History of Racial Segregation in American Education; Foundations of the Second Reconstruction; Southern Attitudes Toward Racial Integration; Desegregation in Higher Education in the South; Desegregation in the District of Columbia: A Developmental Process; The Impact of Segregated Housing on Public Schools; The Legal Status of School Integration; *PART II*, THE INTERNATIONAL SCENE: Segregated Education in International Perspective; The Education of Racial Minorities in South Africa; Racial Segregation in Education in South Africa; *APPENDIX*: Exclusive State Control Over Public Education; Chronological Outline of Racial Segregation and Integration in U.S. Schools; Biographical Background of Contributors.

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—PAUL WOODRING
EDUCATION EDITOR
SATURDAY REVIEW

EVENTS

Editorial

OBSERVATIONS OF SOVIET EDUCATION IN 1960

TBILISI, GEORGIA, U.S.S.R.

THE THIRD TRIP by the writer to the Soviet Union for the purpose of visiting educational institutions and conferring with educators did not yield many new insights. The old forces were at work and were deepening their impacts on the minds of Soviet Man, new and old. The school reform ushered in last year as a result of Premier Khrushchev's insistence in 1958 is being put into operation, although at a somewhat slower rate than might be expected.

The following comments present some generalizations of what was heard and seen during a month's trip to five of the 15 Soviet republics:

1. There was evident resentment on the part of Soviet educational leaders toward American evaluations of education in the U.S.S.R.

2. Work in the form of production is an integral part of all education and is to serve as a social leveler.

3. Khrushchev's avowed aim of bringing school closer to life is resulting in a program of life adjustment education with a vengeance. The imperative "Learn, learn, learn" of Lenin has become the "Work, work, work" of Khrushchev. Such is the contemporary corrective for Seneca's "Non vitae sed scholae discimus."

4. Soviet educators are in full agreement, as always, with official educational theory. They show some differences in the details of practice. In brief: unity in the essentials, diversity in the accidentals. Some non-Soviet visitors have mistaken difference in method for divergence of opinion.

5. The fundamental Communist nature of the program and process of education is being re-emphasized. The Soviet government's official report for 1959-60, submitted to the 23rd International Conference on Education in Geneva, is forthright on this point: "Special weight is attached to the ideological and political education of students in the process of teaching all subjects, to the upbringing of children and young people in the spirit of Communist ideology and morals, in the spirit of Socialist patriotism and proletarian internationalism, in the spirit of peace and friendship among the nations, to develop in them respect for work and to make them ready for public activities." Contrary to the publicly expressed opinion of several prominent Americans that the Pioneer group is the equivalent of the Boy Scout movement, this report stresses that "the Pioneer and Komsomol organization is an independent mass political organization of Soviet children and youth which helps them to live, study and work in a Communist vein" (official translations).

6. The growth of the boarding schools and the prolonged day schools, together with the plans for boarding preschools, indicates an adherence to the Spartan (and also to Communist Chinese) ideal of weakening or even eradicating the family, and thereby every non-Communist or anti-Communist, influence upon the child.

7. Since 1958, there has been a definite revival of the teaching of atheism through science instruction and other means in educational institutions. Some schools display elaborate exhibits of the evils of religion.

8. The withering away process, familiar to the students of Marxism, is evident in relation to nationality culture and education in such areas as Kazakhstan. Contrary to the public statements by Lenin and Stalin concerning the perpetuation of minority cultures, even if only in a Communist guise, there is little doubt as to the impending disappearance of many nationality cultures in the Soviet Union. Considerable resistance to cultural assimilation can be seen in the Georgian Republic, but the eventual decline of the native culture is not an impossibility. Alone among the minority nationalities in the U.S.S.R., the Jews are the victims of cultural and educational discrimination in that their languages and traditions may not be taught in the schools and their avenues of cultural expression remain severely restricted.

9. In spite of centralization and standardization, one can observe radically uneven practices, standards, and results in the schools and higher educational institutions.

10. There is a frequent lack of correlation between word and deed in Soviet education. It is a rare teacher or student of a foreign language who can bring his schooling closer to life by obtaining a non-Communist newspaper or periodical in that language or by visiting the foreign people in their own habitat. Thus, the writer met no professor, teacher, or student of German who had been to Germany—even Communist Germany.

11. Soviet students have numerous opportunities to obtain a higher education through correspondence courses and evening classes. Apparently, all they need is time, energy, and persistence.

12. Teacher education in the U.S.S.R. consists of subject-matter content (including ideology) plus educational theory *and* methodology.

13. The University of the Friendship of the Peoples, announced by Khrushchev in February as scheduled for opening in October, seems to be an echo of the ideological "universities" founded in the 1920's and 1930's to train Communist leaders for the various regions of the world.

14. The Soviet educators do not lack problems—achieving a balance between manual and academic training; the effective teaching of Russian in non-Russian national schools; the teacher shortage in such fields as mathematics, physics, and even foreign languages; overburdening of pupils; the perennial necessity to indoctrinate ideology and atheism in children and youth; and the adequate financing of school construction.

The development of Soviet education is a fascinating subject. More Americans should observe it at first hand and study it on the basis of original sources.

WILLIAM W. BRICKMAN

GRADUATE ENROLLMENT FIGURES

THE TOTAL NUMBER of students enrolled for advanced degrees in the 572 U.S. colleges and universities which grant such degrees was 305,000 in the fall of 1959, according to the U.S. Office of Education. Of this number, 76,000 were seeking advanced degrees in agriculture, mathematics, biological and physical sciences, selected social sciences, and health professions. Of the total, only one-third (115,000) were studying full time. However, 60% of the students majoring in agriculture, mathematics, science, and health subjects combined were enrolled full time.

The data from this new annual survey are needed for the planning and administration of governmental fellowship, training, research, and facilities programs. Use of this information and data annually furnished by the U.S. Office of Education on the number of degrees granted will help employers to estimate in advance the approximate number of graduate students available for employment and postdoctoral research in certain fields.

The largest enrollment for advanced degrees (24,000) was reported for physical sciences. This includes 11,000 in chemistry and 9,000 in physics. Enrollment in biological sciences totalled 13,000; mathematical subjects, 10,000; and psychology, 9,000.

Half of the students majoring in mathematics, science, and health professions were in the first year of graduate study. Less than 10% were in the final year of programs leading to a doctorate.

The scope of the survey will be expanded in order to obtain detailed figures on enrollment for advanced degrees in a variety of other fields.

NATIONAL DEFENSE FELLOWSHIPS

THE U.S. OFFICE OF EDUCATION has announced the award of 1,491 National Defense Graduate Fellowships

(Continued on page 400)

Problems of Doctoral Study in Education*

By HOLLIS L. CASWELL
President, Teachers College, Columbia University

THERE ARE ALL TOO FEW rigorous programs of recruitment and selection of students for advanced work in education. Too often the desire of individuals to possess a degree is the major factor in determining who undertakes such work. Institutions offering doctoral programs should play a far more active role than they now do in discovering and drawing into their student bodies persons of superior elementary preparation and outstanding professional promise. Every institution which offers any advanced work in education should have a well-organized program to discover able people and to encourage and assist them to carry forward their study.

It often is pointed out that teaching does not attract persons of as high-level ability as do medicine, engineering, and law. This is true on the average. However, two facts are often overlooked. First, the range of ability within the teaching profession substantially overlaps the range in more highly favored professions. Second, the number of teachers is much greater than the number of doctors, lawyers, or engineers. Consequently, there is in the teaching profession a large group of persons of high-level ability upon which to draw for leadership preparation. The principal problem is not lack of potential leaders.

Salaries in the teaching profession are relatively so low and assistance for advanced study in education is so limited that schools of education are seriously handicapped in recruiting the most able and promising from those in the teaching profession and providing them with the financial assistance which they need to undertake full-time advanced study. There is urgent need for major extension of scholarship and fellowship aid. Large numbers of very able teachers simply cannot finance programs of full-time study for the doctorate out of their earnings. Those who do so generally make substantial sacrifices. This fact accounts for many, although by no means all, of the weaknesses in advanced programs in education. Of this I am confident: substantial improvement in educational leadership requires both better recruitment and selection of persons for advanced study and more effective programs for their preparation. The two must go hand in hand.

There is considerable confusion over standards for doctoral study in education. Among the causes of this confusion is the failure of some faculty members in schools of education to differentiate between the proper application of standards in programs of general education and in professional study. In general education in the elementary and secondary school the problem is to see that the student receives as much education as he is capable of achieving. He is required by law to be in school for a substantial period of time, and custom sets high-school graduation as a desirable goal for all. Thus, it becomes reasonable to appraise the adequacy of achievement in terms of what the individual is capable of doing and to adjust instruction to the individual's capacities.

Some faculty members in professional schools of education tend to apply this same conception of standards to the students with whom they work. This is a fallacious and damaging transfer of a theory from a level of education where it is sound to a level where it does not properly apply. In a profession it is not adequate that the individual practitioner do as well as he can; it is essential that he meet professionally derived standards. For example, it is not sufficient that a surgeon perform operations to his highest level of competence; he must be able to do them with sufficient skill to be recognized by his peers as having acceptable competence. The same principle should apply to the educational profession. Standards of professional competence should be clearly defined, and those who cannot meet them should be denied degrees and credentials which indicate that they are prepared to render specialized service or to occupy leadership positions.

A second cause of inadequate application of standards for admission to doctoral study in education is the lack of distinction drawn between in-service education designed primarily to keep a teacher or an administrator abreast of his field on the one hand and, on the other, the pursuit of a systematic program of study designed either to lift a person to a definitely higher level of performance or to prepare him for a more specialized or demanding type of position. Knowledge advances in all professional fields so rapidly that every practitioner should be studying constantly to keep abreast of new developments. Failure to do this results in a reduction in the quality of service he renders. But this continu-

* From the president's annual report to the trustees, Teachers College, Columbia University, 1958-59.

ing study, whether done under the guidance of a professional school in courses, workshops, conferences, and seminars or on an individual basis, is or should be different from studying for an advanced degree. Programs for the doctorate in education would be greatly strengthened if this distinction were recognized.

Inadequate standards of admission and study at the doctoral level in education are attributable to a third factor. In contrast to many fields of specialization, the master's degree in education does not serve primarily as a basis for selecting those who are competent to undertake doctoral study. In academic fields, work for a master's degree is a testing ground to discover those who are able to pursue further work successfully. Course requirements, introduction to research procedures, and the master's thesis are all designed to make this phase of advanced work the first step in a sequence leading to completion of a doctor's degree.

In education this is not the case. The master's degree is the logical conclusion of the first phase of a student's professional preparation. It is widely agreed that an adequate program in general and professional education to meet the optimum standard for all teaching positions requires four years of undergraduate and one year of graduate work. At present, only a few states require five years of preparation for full accreditation as a teacher, but the trend is definitely in the direction of this standard. It may be expected that as soon as the teacher shortage is met, there will be a rapid movement toward this requirement. Successful completion of the master's degree consequently tends to serve primarily as the conclusion to a program of preparation of those who are considered fitted for teaching rather than as evidence of promise for pursuit of doctoral study. In other words, in education, study for the master's degree is more closely allied with the undergraduate sequence of courses in general and professional education than it is with the doctoral program. Work for the master's degree always will reveal potentialities for more advanced work, just as undergraduate study does, but it is not ordinarily treated as a testing ground for competence to pursue more advanced work.

This contrast between education and academic fields as studied in graduate departments of arts and sciences arises out of a basic difference in the purposes of study. In the academic subjects, graduate work is designed primarily to produce research scholars. Students move into increasingly higher levels of specialization as they proceed through the M.A. requirements to completion of the Ph.D. dissertation. In education, the central purpose is to prepare a teacher who will be able to deal intelligently and effectively with the wide range of subject matter and pupils that must be taught in elementary and secondary schools and in programs of general education at the junior college level. Research specialization, with its narrowing influence, is likely to be a handicap in such teaching. Since central purposes differ so fundamentally, it is unwise to take the same view of master's work in academic fields leading to research specialization as is taken of master's work in education leading to teaching.

This tendency for the master's degree to become the normal expectation in preparing teachers competent to be fully certified in the profession presents a distinctive problem in selecting those who possess the qualities to pursue doctoral study. The important point of division in the professional preparation of educators comes in determining which ones should pursue in-service study beyond the master's degree as a means of keeping up with their fields and which ones should be encouraged to continue their preparation through systematic programs leading to the doctorate. It is this selection which as a rule is being done inadequately and which should be dealt with on a more rigorous basis than at present.

Present programs of doctoral study in education are too largely course-oriented. The typical pattern of work places great emphasis on the completion of a prescribed number of course credit hours. Requirements are generally so broad in nature that often little real direction is given to the formulation of programs of study which possess consistency and provide optimum preparation for positions of major responsibility and high-level specialization.

All too often, students' programs are a hodgepodge of courses, a large number taken while the student is on a job and selected because of the particular hour or day they are scheduled. In too many cases the concern of the student is simply to amass a given number of credit hours.

This approach to doctoral study is encouraged by institutions offering courses of an extension type which are credited toward the doctorate on the same basis as courses taken in residence, when major attention is being devoted by the student to his advanced work. In some instances, numerous courses of the workshop and problems type, without sequential relationships and clearly defined subject matter, are included in programs accepted for doctoral requirements. An article in the July 19, 1959, issue of *The*

New York Times stated that 118 different off-campus extension courses would be given for teachers on Long Island in the fall of 1959. It is not known what proportion of these courses carry credit which would be accepted to meet requirements for the doctor's degree; but it is a reasonable assumption, based on present practice, that a substantial proportion is so recognized.

This pattern of course credit accumulation results in doctoral programs of study which are lacking in over-all design and in rigorousness. Too many students do not gain mastery of a field planned on the basis of recognized requirements for knowledge and competence. Lacking this, it may not properly be said that they are pursuing doctoral study.

Even though doctoral programs in education give great emphasis to the accumulation of course credit, there often is a lack of clear definition of the subject matter over which students preparing for particular positions should have mastery. In fact, sometimes there is the implicit assumption that there is no particular body of content with which the student should be acquainted. This, I believe, is a serious weakness in doctoral programs.

It is true that the goal of professional study is ability to do something, not merely to know about it. This fact, however, does not justify the conclusion that mastery of given bodies of content is unimportant. The extent of such mastery is, in fact, an important indication of the level of performance at which a person in a profession works. Mastery of the knowledge in a field serves the worker in two important ways: (1) it enables him to understand why professional activities may best be performed in certain ways; and (2) it assists him in modifying his procedures as new knowledge becomes available.

In many fields of advanced study in education, much greater attention needs to be given to determining just what body of knowledge the student should command if he is to operate at the highest level of professional competence. Programs of doctoral study should be organized so that students will gain such mastery.

All too often work on the doctorate is not obviously more advanced than work on the master's level. As a matter of fact, it is common practice for students at both levels to take many of the same courses. In some instances this is justified—for example, when there are subjects supplementary to the field of specialization of a doctoral candidate in which only a general background is needed. But ordinarily there is not nearly the extent of differentiation that should exist between courses designed for master's and doctor's level students.

All phases of a doctoral program should expect and require a level of competence and application exceeding that of the M.A. degree student. Offerings should be planned with this in mind, and standards should be adjusted accordingly. This is particularly important in education, where master's degree work should be the desirable minimum preparation for all those in the profession.

The ultimate outcome of a professional program should be the ability to render competent professional service. Knowledge is essential, but it should be knowledge which can be interpreted into action. It is this requirement which makes professional education difficult. As a rule, it is far easier to see that a student gains verbal command of a body of facts and principles than it is to teach him to use such knowledge as a guide to action in actual situations. To achieve this goal, careful provision must be made for supervised firsthand experience as a part of any sound professional program.

The physician in training may know verbally all the symptoms of various diseases as stated in medical textbooks, but until he has had extensive experience, under expert guidance, with patients, he is not prepared to practice medicine efficiently. For this reason, medical education includes substantial emphasis on clinical courses, internship, and hospital residency.

The same problem exists in the preparation of educators. A student can learn to perform specialized services in education, translating into action the best available knowledge concerning these services, only by having supervised practice in actual field situations. In the preparation of persons for positions of educational leadership, too little attention has been given to aiding students to carry over into practice knowledge and procedures dealt with on the verbal level in courses. There is great need in every field of doctoral study in education to discover how guided field experience can be co-ordinated most effectively with course work and research so that upon completion of work for a doctor's degree the student not only has knowledge essential to performance of professional tasks, but also has experience in putting this knowledge to work.

One important goal of professional preparation on the doctoral level should be the development of habits of independent study which enable a student to keep abreast of his field of specialization and constantly to seek new and improved ways of performing his professional activities. The present course-oriented programs of

doctoral work minimize entirely too much the advantages of independent study by students individually and in small groups. When individual students assume major responsibility for their plans of work, two or three well-planned faculty conferences may stimulate more professional growth than an entire course; and an individually planned and directed reading program may result in far more useful knowledge than meeting the required reading assignments in several courses.

It is my judgment that fundamental reorganization of programs, so that areas of required competence are clearly indicated and students can develop individualized plans of meeting the requirements, would serve to increase greatly student motivation and achievement. Major experimentation designed to move away from the present course-oriented emphasis toward greater individual student initiative and freedom seems, to me, to be highly desirable.

Teaching the New Mathematics

By JOHN R. MAYOR
American Association for the Advancement of Science
Washington, D. C.

and JOHN A. BROWN
University of Delaware

THE NATIONAL INTEREST in the improvement of instruction in secondary school mathematics is phenomenal. Although in all areas of education there is interest in modernizing curriculum, the current activity in mathematics appears to be more exciting, revolutionary, and widespread—and perhaps more needed—than in any other discipline. Mathematics is the one subject in which curriculum change always has been slow. It still remains true that a translation of Euclid's "Elements," written over 2,000 years ago, used with a mimeographed set of exercises, would be considered acceptable classroom material for many 10th-grade geometry courses. Now mathematicians working as team members with secondary school teachers, under the auspices of SMSG,* have turned their thoughts and efforts to modernizing mathematical content and organization.

The revolution in mathematics curriculum may be said to have started at the college level at the University of Chicago soon after World War II. The Chicago experimental program was intended to improve mathematics for general education. There is a tendency for the new secondary school courses to be planned for those capable of college and certainly to be so interpreted. It is natural, both for those developing the new materials and for the schools in adopting them, to think of new materials in terms of subject matter for the gifted. Currently, however, there is also great emphasis on new courses for purposes of general education. This is particularly true in the junior high school and in the elementary grades. Without sacrificing computational skills, meaning and understanding of major concepts and ideas inherent in mathematics are developed. These concepts are basic to all computation and to applications. The memorization of algorithms is minimized. Throughout the new courses children are led to discover new properties and to develop strategies rather than to use rules in problem-solving.

In teaching the new mathematics, emphasis is placed on structure and precision of language. In the seventh and eighth grades, and earlier, properties of operations with numbers are studied as properties of a number system, such as closure, and the commutative and associative properties. The system of whole numbers (0, 1, 2, 3, . . .) has the closure property for addition and multiplication but not for subtraction and division. New numbers in an extended system, fractions for division and negative numbers for subtraction, must be introduced to provide for the closure property. Operations with the new numbers are defined so that the operations will satisfy the other properties as well. In the system of whole numbers, addition and multiplication are commutative [$5 + 6 = 6 + 5$; $5 \cdot 6 = 6 \cdot 5$] and associative [$3 + (4 + 5) = (3 + 4) + 5$; $3 \cdot (4 \cdot 5) = (3 \cdot 4) \cdot 5$] Again, subtraction and division do not have these properties. The "set" language with a minimum of notation is used extensively with numbers and also in geometry in talking about a set of points on a line or on a plane or in space. An angle is first defined as a set of points.

Careful distinction is made in use of words, such as rational number, fraction, number, and numeral. A line segment and the length of a seg-

* The director of the School Mathematics Study Group is Dr. E. G. Begle, Yale University. SMSG is sponsored by the National Science Foundation and has the co-operation of the National Council of Teachers of Mathematics, the Mathematical Association of America, and the American Mathematical Society. The mailing address of SMSG is: Drawer 2502A, Yale Station, New Haven, Conn.

ment are treated as distinct concepts, as are angle and the measure of an angle.

Elementary notions of probability are introduced in grade 7; negative numbers, even earlier. Notions from topology and number theory first find their places in the junior high school. Euclidean geometry is studied in grade 10 using a new set of postulates based on properties of the real number system. The grade 10 course includes solid geometry and analytic geometry, as well as topics traditionally studied at this level. Deduction plays a more important role in mathematics as early as grade 7. A course in matrix algebra is being tried out in grade 12.

Four factors contribute to the significance of the new mathematics: the new materials should make the teaching of mathematics and the learning of mathematics much more profitable and enjoyable for *all* pupils; the mathematician-teacher team approach to sample textbook writing which has been employed by SMSG demonstrates a promising method for the future not only for use in the mathematical sciences, but also for all other areas of instruction; the development of new courses has proved to be an exceedingly valuable, motivating factor for in-service programs; and the new materials should better enable the schools and colleges to prepare future scientists.

Parents, teachers, and school administrators from Pasadena to Boston share the enthusiasm of secondary school pupils for the new mathematics. Psychologists are working with the writing teams and teachers in finding objective evidence of both achievement and interest in the new courses. The success of the new mathematics may be due in considerable part to the enthusiasm of the teachers. Whether the enthusiasm of the teachers has been generated by the excitement of new materials or by their quality and teachability remains yet to be shown.

In 1959-60, the new mathematics courses of SMSG for grades 7-12 were tried out in over 100 schools by more than 600 teachers in all parts of the country. The experimental materials were developed by working teams of mathematicians and teachers during the summer of 1959 at the University of Colorado and the University of Michigan and revised at Stanford University in the summer of 1960. Revisions were based on reports from teachers who taught the experimental materials. The value of this kind of teamwork cannot be overestimated. The mathematicians can identify the underlying concepts of modern mathematics and can make certain that, in the writing, errors, particularly in vocabulary and in logical development, do not occur. The teachers can determine the suitability of the materials and examine the writing from the point of view of readability and usability in the classroom. Properly, the children with whom the new materials were tried also should be considered a part of a great experimental research team in education.

In the recent criticisms of the schools, much stress has been laid on the poor preparation of teachers—particularly in science. Schools throughout the country have attempted to meet this need. In those instances where teachers are teaching experimental courses containing new ideas, new organization, and emphases on structures not familiar to them from college courses, teachers eagerly have sought opportunities to study the new mathematics through in-service programs. Typical of the situation in the country as a whole is that of the Washington area. In 1957, a two-day in-service program for mathematics teachers was offered in one of the school systems in the form of a series of mathematical lectures, the first time in this school system that an in-service program of mathematical lectures had been offered. There seemed to be some concern on the part of school officials and teachers about whether such lectures would be acceptable. In a short period of three years, the requests from this school system and others in the Washington area for courses in mathematics as a part of an in-service program have been so great that local universities are unable to meet the demand.

Competent research mathematicians, with a great many calls for their time to direct research and the study of graduate students and for consultation services from industry and government, are giving their time to SMSG because of their desire to improve education—and education in mathematics in particular. They enthusiastically would welcome, with the schools, the time when undergraduate college professors would not feel that their students are poorly prepared and when departments of mathematics no longer would have to offer precollege-level work. These scientists also hope that the new courses, because of their emphasis on concepts and structures, will enable graduate students in mathematics and the other sciences to carry on independent research at an earlier age than now seems possible.

For those critics of education who have had doubts about the eagerness of teachers to learn, to improve themselves, to introduce new ideas, the new movement in mathematics should be most heartening.

Developments in Soviet Education

By INA SCHLESINGER
White Plains, N. Y.

January-December, 1959

ALTHOUGH THE REORGANIZATION of the Soviet school is not to be completed until the 1963-64 school year, the main features of the new system already have been established. Curricula for the various types of schools have been published and the syllabi have been discussed in the press.

The curriculum of the secondary classes of the eight-year school offers a slightly expanded program of general-education subjects, as compared with the seven-year school. The content is rearranged so as to ensure that children who will not go beyond the compulsory minimum of eight years will have a solid grounding. Thus, the history of the U.S.S.R. is introduced in classes 7 and 8; physics, mathematics, and chemistry are somewhat more extensive; and biology includes the anatomy and physiology of man. The time devoted to labor is increased to five weekly hours for classes 5-8, as compared to two hours in classes 5-7 and three hours in class 8 of the seven- and 10-year schools, respectively. Pupils of the eight-year schools are to be trained in "mass" professions which require little or no special skills.[1]

The curriculum for the second stage of secondary education now includes additional content in the sciences. In the secondary polytechnic school with production instruction (classes 9-11), pupils will spend two-thirds of their time in studying general-education and polytechnic subjects and one-third in acquiring a specialized profession. Much of the discussion about the new school centers around the problems involved in giving pupils labor training in these schools.

There is general agreement that a school must decide which professions are to be taught in consultation with the regional economic planning organization and with the sponsoring plant or collective farm. The first consideration is given to future manpower needs of the economic unit and pupils are to have a choice of professions within these limits.[2] The sponsoring farm or plant agrees to train pupils in its establishment during their schooling and the expectation is that graduates of the school will remain at work there at least for a time. Although professional training is to be "polytechnic," so as to enable the worker to transfer readily from one job to another in any industry, it is not quite clear how this is to be achieved. The effect of this type of training seems to be to tie the young worker to his native region for the first years of his working life.

The same principle underlies the recent decree[3] which permits collective farms and enterprises to send their best workers to universities and special educational institutions for further study. The employer organization pays the stipends for these students and they are obliged to return to work in the sponsoring organization after graduation.

Methods of training secondary school pupils for a profession vary according to the facilities of the plant, farm, or school. If the plant can spare the space and the necessary instructors, it will set up instruction shops for pupils; if the school workshops are adequately equipped, instruction will take place there. On the farms, the brigade method of instruction seems to be preferred and work proceeds on a special study farm or on the collective farm proper. In the plants, pupils are sometimes apprenticed individually to an experienced worker for training.

The relations between the school and the sponsoring enterprise may become difficult at times. This is natural, as the plant management must think about production, while the school must concentrate on teaching. The plants often protest at having pupils (or students) thrust on them for training. On the other hand, educators complain that managers insist on production results from pupils who are in the enterprise merely for instruction purposes.[4]

Some schools have established regular production enterprises which are intended to be profitable organizations. Many such school factories work on orders from the sponsoring plants which furnish the necessary material and sometimes also the machines. In such cases, pupils are often paid for their work.

Schools for working and rural youth are being reorganized to accommodate future eight-year school graduates who desire to continue their

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[1] Such "professions" as chauffeur, sales clerk, field worker, fruit grower, and textile worker.

[2] A recent congress of psychologists found that any person could do any kind of work successfully and held that the necessary professions should be more effectively publicized if pupils or students were to choose them.

[3] *Pravda*, Sept. 20, 1959.

[4] See B. Mostiev, "Pri Pod'emie na Gory," *Izvestiya*, Jan. 7, 1960, and "S'ezdy Uchitelei," *Uchitel'skaia Gazeta*, Dec. 24, 1959.